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A FOURTH ALLELOMORPH IN THE ALBINO SERIES  
IN MICE<sup>1</sup>

IN recording the occurrence of a new mutant gene in the house mouse, allelomorphic to color and albinism, Detlefsen ('21)<sup>2</sup> described a very dilute, wild form in which the hair showed traces of a light brownish tinge with a suggestion of sootiness, and the eyes were somewhat less heavily pigmented than in the wild type. This general form of pigment reduction is also characteristic of other color allelomorphs; for in the case of the ruby-eyed rat, the ruby-eyed guinea-pig and the chinchilla rabbit (Castle '21),<sup>3</sup> the yellow pigment is very greatly reduced or even obliterated, while the darker pigments (black or brown) are at least slightly modified. The mutant mouse, however, showed a far greater pigment reduction than either the rat, guinea-pig or rabbit mutants. Breeding tests demonstrated that this dilute mouse mutant was a color-albino allelomorph, and in this respect resembled the ruby-eyed rat and guinea pig genetically (the chinchilla rabbit had not been recorded at that time), but Dr. Detlefsen pointed out that "it is hardly safe to insist that these mutations are identical. . . . We are also unable to prove that they are different, for the genes may be identical but simply give different somatic effects, since the residual inheritance can not be the same." He also suggested that the discovery of a new dilute type of mouse (which he was seeking at that time), more like the rat or guinea pig in its somatic appearances as well as in its genetic behavior, would give us more assurance that his extreme dilute mouse mutant was not the homolog of the ruby-eyed rat or guinea pig. Unusual as it may seem, I had discovered exactly such a new dilute mutant mouse in January, 1919. By comparing it with Dr. Detlefsen's set of rodent skins and by testing it in appropriate matings, I recognized its genetic significance just before his paper appeared in print.

The discovery of this new mutant mouse enables us to say at once that the extreme dilute mutant was not the homolog of the ruby-eyed rat or guinea pig or the chinchilla rabbit, and supports Dr. Detlefsen's position in hesitating to homologize

<sup>1</sup> Paper No. 22 from the Genetics Laboratory, College of Agriculture, University of Illinois.

<sup>2</sup> Detlefsen, J. A., 1921, *AMER. NAT.*, Vol. 55, p. 469.

<sup>3</sup> Castle, W. E., 1921, *Science*, N. S., Vol. LIII, p. 387.

his mutant with these forms. Dr. Detlefsen's form is evidently lower in the scale running from color to complete albinism in very much the same way that the Himalayan form is nearer to the albino than is the chinchilla rabbit.

The new mutant was procured from a fancier who had been breeding it for some time. It resembles the ruby-eyed guinea pig, ruby-eyed rat and the ruby-eyed or chinchilla rabbit (Castle '21)<sup>4</sup> in the degree of pigment reduction in the hair, but the eyes are apparently darker than those of the rat and guinea pig. I have not had an opportunity to examine the eyes of the chinchilla rabbit. It forms one of a series of quadruple color allelomorphs in the mouse and may be designated as *cr*. In a scale of dominance, the four forms probably fall into the following order: ordinary intense or wild color, *C*; dilute, *cr* (described in this paper); extreme dilute, *c<sup>d</sup>* (described by Detlefsen ('21);<sup>5</sup> and complete albinism, *c*. Wild color (*C*) is completely dominant to the other allelomorphs, but *cr* and *c<sup>d</sup>* are incompletely dominant to albinism. The cross between *cr* and *c<sup>d</sup>* has not yet been made, but the heterozygote (*cr**c<sup>d</sup>*) will probably be found to give an intermediate shade.

The black agouti type of the homozygous mutant (*AABBcr**cr*) possesses black pigment which is reduced to a very dark dull slate-color, while yellow is greatly reduced and appears about intermediate between white and the normal yellow of the wild type. In the non-agouti type of the homozygous mutant (*aaBBcr**cr*), which can be distinguished readily from the agouti form, the black pigment is also reduced to a very dark dull slate-color, but perhaps darker than in the agouti type.

When the black agouti type of the mutant is heterozygous for albinism (*AABBcr**c*), black pigment is reduced to a brownish shade and yellow is practically reduced to white. In the non-agouti type of the heterozygous mutant (*aaBBcr**c*), black is reduced to a dull brown, a little lighter than the ordinary fancier's chocolate type. The heterozygous mutants, mated interse, produce the homozygous type, the heterozygous type and albinos in the ratio of 1: 2: 1.

I have not yet identified the mutant without black pigment that is in the cinnamon or brown class.

H. W. FELDMAN

<sup>4</sup> *Loc. cit.*

<sup>5</sup> *Loc. cit.*